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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Exchange or UF_6 Value[2]	Seller	Buyer	Remarks
4151	1989-98	5,001-10,000	R[3]	Producer	Utility	Transaction occurred in late 1987
4243	1987	less than 50	98—102	Intermediary	Producer	US-Origin
4244	1988	101-300	98—102	Producer	Producer	US-Origin
4249	1988	101-300	98—102	Intermediary	Utility	UF_6
4254	1988	less than 50	98—102	Utility	Intermediary	US-Origin UF_6
4255	1988	50-100	98—102	Intermediary	Utility	UF_6
4256	1988-92	601-1,000	R[3]	Producer	Utility	Transaction occurred in late 1987
4257	1988	101-300	98—102	Producer	Utility	UF_6

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF_6 Value) *plus* the premium (relative to the Exchange Value or UF_6 Value). The range reflects five percentage points (inclusive) per grouping, centered about the middle of the range.
[3] The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.

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Conversion Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price Range as Percent of Current C.V.	Seller	Buyer	Remarks
4245	1988	101-300	93-97	Intermediary	Utility	
4252	1988	101-300	R[3]	Intermediary	Utility	

Enrichment Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity[4] (thousands of SWU)	Approximate Price Range as Percent of Current SWU Value[5]	Seller	Buyer	SWU Origin	Remarks
4251	1988	less than 50	93-97	Intermediary	Utility	R[3]	

[1]Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF6 Value) *plus* the premium (relative to the Exchange Value or UF6 Value). The range reflects five percentage points (inclusive) per grouping centered about the middle of the range.
[3]The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.
[4]If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[5]Prices are usually normalized to 0.30% tails assay. Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.

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CURRENT MARKET DATA

URANIUM SUPPLY
(January 31, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
87-1002*	270	—	
87-1005*	200	400 per year	1988-95
87-1023*	500	500 per year	1988-90
87-1061	200	200 per year	UF_6, 1988 on
87-1123	400	—	
87-1130	750	—	
87-1141*	500	200 per year	1989-92
87-1152	200	—	
87-1156	825	—	
87-1161	1,000	1,000 per year	
87-1175	175	—	UF_6
88-1000*	420	—	U_3O_8 or UF_6
88-1001*	200	—	1988
88-1026*	300	—	1988
87-1001	—	400 per year	1989 on
TOTAL:	5,940		
INACTIVE			
87-1017	1,000	—	
87-1053*	100	400 per year	1989 on
87-1135	500	—	
87-1159*	40	—	
87-1019	—	600 per year	1988-91
TOTAL:	1,640		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1059, 1055, 1120, 1142.

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URANIUM DEMAND
(January 31, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
87-1121	650	650 per year	1988-96
87-1158	150	—	U_3O_8 or UF_6
88-1011*	30	—	UF_6
88-1017*	750	—	1988, UF_6e
88-1024*	50	—	1988
87-1013	—	1,200 per year	1990-95
87-1021	—	200 per year	1992 on
87-1108	—	200 per year	1991-2000
87-1134	—	260	1989
87-1150	—	1,000 per year	1989-92
87-1166	—	650	1989, UF_6
87-1172*	—	500 per year	1990 on
TOTAL:	1,630		
INACTIVE			
87-1040*	300	300	1989
87-1114	525	—	
87-1122*	500	—	1988
87-1125	390	—	
87-1146	3	—	
87-1163*	160	—	1989-92
88-1013*	160	—	1988, UF_6e
88-1014*	190	—	1988
88-1015*	135	—	1988
88-1022*	—	225	1989, UF_6
TOTAL:	2,463		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1030, 1049, 1138, 1168, 1169, 1174, 1176.

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NUEXCO

CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(January 31, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
87-1012*	2,000	—	
87-1064*	600	—	
87-1071	1,000	—	UF_6
87-1157	4,000	—	
87-1167*	450	—	
88-1023*	500	—	
TOTAL:	8,550		
INACTIVE			
87-1031	1,000	—	
87-1033	1,000	—	
TOTAL:	2,000		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 1119.

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CONVERSION SUPPLY AND DEMAND
(January 31, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale:			
ACTIVE			
88-1000C*	220	—	
88-1004	150	—	
TOTAL:	370	750	
INACTIVE			
87-1008	750	750	
TOTAL:	750		
Inquiries to Purchase:			
ACTIVE			
88-1020*	120	—	
88-1021*	80	—	
TOTAL:	200		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 1132, 1155, 1160, 1072.

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CURRENT MARKET DATA

SWU SUPPLY AND DEMAND
(January 31, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of SWU) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale: ACTIVE			
87-1058	90	—	1988
87-1068	100	—	1988
88-1006*	230	—	1988
TOTAL:	420		
INACTIVE			
87-1004*	55	—	1988
87-1128*	300	—	1988
TOTAL:	355		
Inquiries to Purchase: ACTIVE			
87-1162*	150	—	1988
88-1017*	160	—	1988
TOTAL:	210		
INACTIVE			
87-1065	150	—	1988
87-1154*	25	—	1988
87-1171	130	—	1988
88-1013*	35	—	1988
TOTAL:	340		

*New or revised since last month.
[1]Measured from the date of this Report.
[2] For delivery within one year. This category excludes SWU deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1096, 1116, 1130.

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ARGENTINA'S NUCLEAR INDUSTRY

Introduction

Argentina occupies a somewhat unusual position among the world's nuclear nations, in that, while possessing a rather diverse nuclear industry, it has managed to remain largely outside the system of international controls, and is not a signatory of the Nuclear Non-Proliferation Treaty. Argentina currently has two operating reactors, Atucha Unit 1 (335-MWe PHWR) and Embalse (600-MWe CANDU), with another under unit, Atucha Unit 2 (698-MWe PHWR) under construction. Commercial nuclear development is primarily under the control of the Comision Nacional de Energia Atomica (CNEA), which also manages a modest uranium production industry. Fuel cycle facilities, notably an enrichment plant at Pilcaniyeu and a pilot reprocessing plant at Ezeiza, are under development. Figure 1 shows the locations of Argentina's nuclear industry facilities.

Political Developments

The Argentine nuclear program has benefitted from President Raul Alfonsin's active support, even though it has suffered from funding cutbacks over the past several years. Using nuclear technology and trade as common ground, in 1987, Alfonsin and Brazilian President Jose Sarney began a potentially historic diplomatic initiative, capped by Sarney's visit to Argentina's highly-secret Pilcaniyeu enrichment facility. In the September 1987 mid-term elections, Alfonsin's Radical Party lost its majority to the highly-nationalist Peronist Party, and Alfonsin is scheduled to leave office in 1989. Thus, Alfonsin could face serious challenges during the remainder of his term over decisions affecting the nuclear program.

The Peronists pledge to increase funding to the CNEA, claiming that the present funding level is much too low. Most Argentine political parties would like to increase CNEA's funding, but where the additional money would come from is unclear, since the Argentine economy has been in a severe recession for several years, and government funding levels are generally low.

The CNEA has evolved from a high-priority, high-budget agency under the former military regime to a less-visible position today. The CNEA has about 6,500 employees, roughly 1,000 of which work in the uranium production division. In mid-1987, CNEA President Alberto Constantini resigned after a long-standing dispute with the administration over funding levels. The new CNEA President, Emma Victoria Perez Ferreira, appears to be more inclined to compromise with the central government on budgetary issues.

The funding problems have affected some sectors of the nuclear industry more than others. Atucha Unit 2 (a Kraftwerk Union-designed unit) is about half-completed, but its construction schedule keeps slipping, due to the lack of funding. Perez Ferreira has said that completion is now expected between 1993 and 1995.

As one of the highest-priority government projects, construction at the enrichment facility at Pilcaniyeu is reported to be about on schedule, and the project has been little affected by budget cuts. Alfonsin has stated his intention to increase the project's budget further, increasing the design capacity from the current 20,000 SWU per year to over 100,000 SWU per year.

With little hard currency available to buy uranium or plant equipment abroad, there is a considerable incentive to keep domestic uranium facilities and industrial plants in operation, even when they are uneconomical. Doing so also supports Argentina's "nuclear independence" philosophy, and is, therefore, politically attractive.

The Goal of "Nuclear Independence"

Argentina has made decisions affecting its nuclear program based on the the desire to become independent of any constraints imposed by other countries, and the premise that it will work towards becoming a full-service exporter of nuclear technology. One aspect of nuclear independence is expressed in Argentina's desire to close the fuel cycle, using largely-indigenous and unsafeguarded technologies.

Given its small (three-reactor) nuclear program, consisting exclusively of heavy water reactors, the country's willingness to spend over a billion dollars in developing fuel cycle facilities (including heavy water production) has caused some other countries to question Argentina's motives. Argentina's participation in talks with Iran aimed at restarting Iran's nuclear program has aggravated this situation, as have the occasional press reports that Argentina has been involved in purchases of unsafeguarded nuclear materials.

The rationale for the nuclear program's export orientation assumes that there is a significant market among Third-World countries for unsafeguarded reactors and fuel cycle facilities. Argentina's semi-indigenous "Argos" reactor

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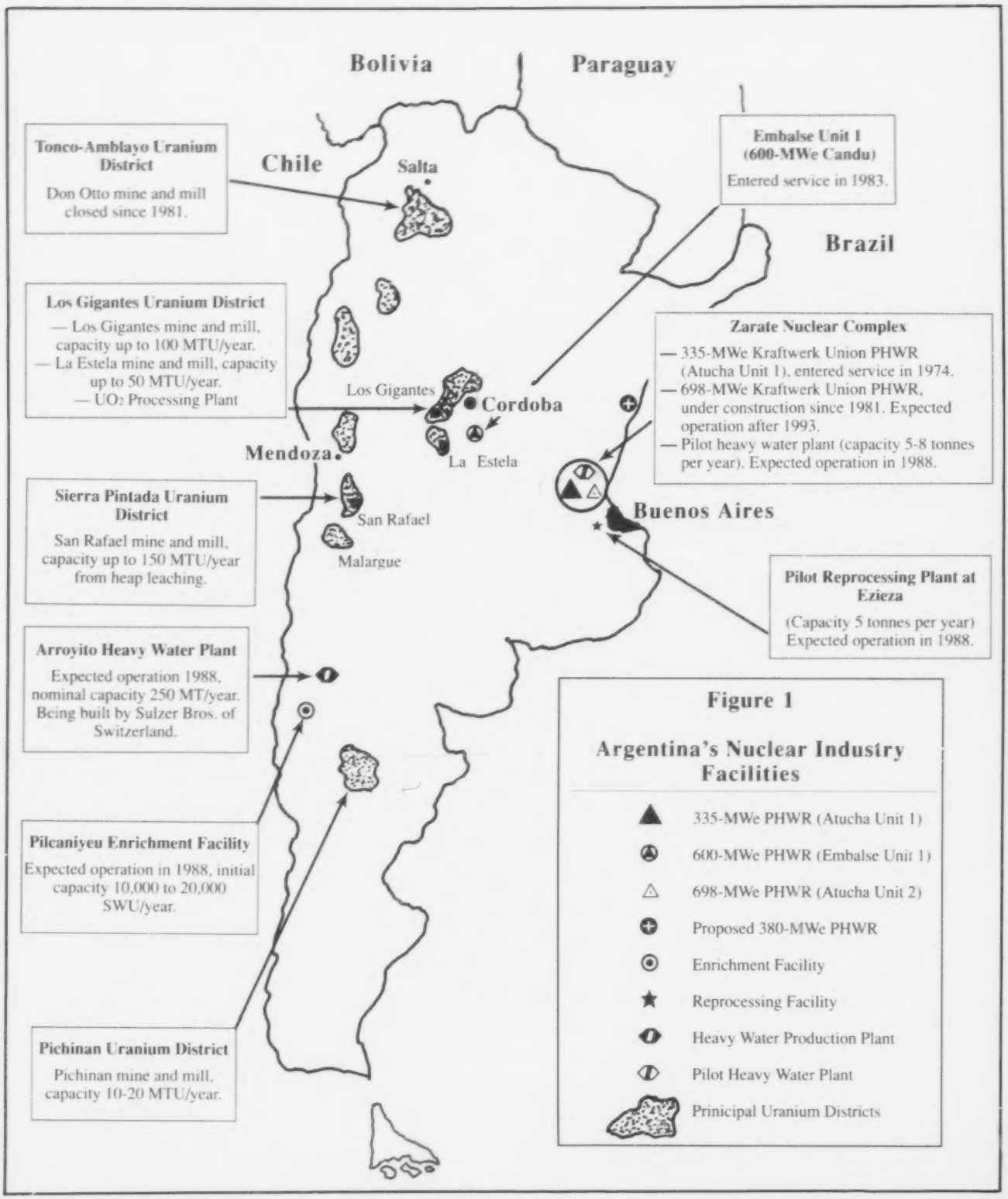
Bolivia
Paraguay
Chile
Salta
Brazil
Los Gigantes
Cordoba
La Estela
Mendoza
San Rafael
Malargue
Buenos Aires
Tonco-Amblayo Uranium District
Don Otto mine and mill closed since 1981.
Embalse Unit 1 (600-MWe Candu)
Entered service in 1983.
Los Gigantes Uranium District
— Los Gigantes mine and mill, capacity up to 100 MTU/year.
— La Estela mine and mill, capacity up to 50 MTU/year.
— UO2 Processing Plant
Zarate Nuclear Complex
— 335-MWe Kraftwerk Union PHWR (Atucha Unit 1), entered service in 1974.
— 698-MWe Kraftwerk Union PHWR, under construction since 1981. Expected operation after 1993.
— Pilot heavy water plant (capacity 5-8 tonnes per year). Expected operation in 1988.
Sierra Pintada Uranium District
San Rafael mine and mill, capacity up to 150 MTU/year from heap leaching.
Pilot Reprocessing Plant at Ezieza
(Capacity 5 tonnes per year) Expected operation in 1988.
Arroyito Heavy Water Plant
Expected operation 1988, nominal capacity 250 MT/year. Being built by Sulzer Bros. of Switzerland.
Pilcaniyeu Enrichment Facility
Expected operation in 1988, initial capacity 10,000 to 20,000 SWU/year.
Pichinan Uranium District
Pichinan mine and mill, capacity 10-20 MTU/year.
Figure 1
Argentina's Nuclear Industry Facilities
335-MWe PHWR (Atucha Unit 1)
600-MWe PHWR (Embalse Unit 1)
698-MWe PHWR (Atucha Unit 2)
Proposed 380-MWe PHWR
Enrichment Facility
Reprocessing Facility
Heavy Water Production Plant
Pilot Heavy Water Plant
Prinicipal Uranium Districts

design, in addition to having been created to fill the niche in Argentina's planning for a fourth reactor, is also meant to compete in the PHWR export market, dominated by Atomic Energy of Canada's (AECL) CANDU line and Kraftwerk Union's (KWU) designs (from which the Argos is derived).

Another example is the pilot heavy water plant at Zarate, site of the Atucha reactors. In the mid-1970s, the plant was started because CNEA believed that foreign suppliers would be unwilling to sell Argentina a large-scale heavy water plant. However, in 1979, Switzerland's Sulzer Bros. agreed to build the 250 tonne-per-year facility now nearing completion at Arroyito (using the monothermal ammonia-hydrogen exchange process). The rationale for continuing to build the small and very expensive (estimated $100 million) water-hydrogen sulfide process pilot plant was that it would provide experience for eventual export of the design (uprated to the 50 to 100 tonne-per-year range). The Argentine design would not carry safeguards, and presumably would find a market in the Third World. Such logic is problematic, in that the only likely customers would be ones buying Argentina's Argos PHWR reactor. Even then, hypothetical buyers would need other sources of heavy water supply as well, because the unit's relatively small size would not supply all reactor requirements.

Uranium Production

Between 1978 and 1987, uranium production in Argentina ranged between 253,000 and 486,000 pounds U_3O_8 per year (Figure 2). Production has dropped each year since 1983, when it was 448,000 pounds U_3O_8, to an estimated 253,000 pounds in 1987. Thus, recent output has been somewhat below that needed to provide fuel for the two

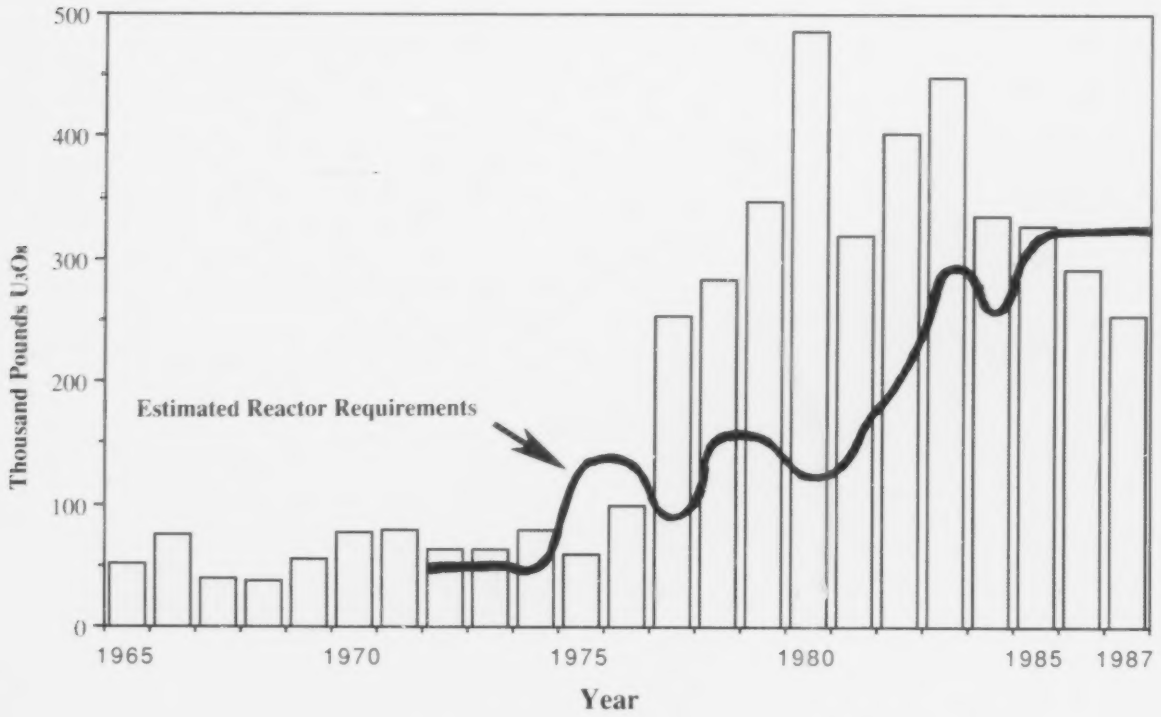

Figure 2
URANIUM PRODUCTION IN ARGENTINA

*Source: up to 1985, CNEA. 1986 and 1987 figures are Nuexco estimates.

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operating reactors, although it is estimated that Argentina has about a two-year forward supply of uranium in inventory. In 1985 and 1986, total uranium requirements for the Atucha 1 and Embalse reactors were about 325,000 pounds U_3O_8 per year. To date, Argentina's uranium production efforts have primarily been aimed at achieving self-sufficiency.

Some foreign observers have predicted that Argentina will face a uranium shortage in the 1990s, when Atucha Unit 2 and possibly another planned unit will enter service. When Atucha Unit 2 comes on line, it will increase annual uranium requirements by about 260,000 pounds U_3O_8. However, if a significant investment is made to increase production in the Sierra Pintada orebody, Argentina should be able to meet its domestic uranium needs in the future.

Total uranium reserves are thought to be about 520 million pounds U_3O_8, of which only about 50 million pounds are considered Reasonably Assured Resources (RAR) and about 39 million pounds are accessible at under $36 per pound ($80/kg)*. The main deposits are at Los Gigantes (Cordoba Province), Sierra Picinan (Chubut Province), Sierra Pintada (Mendoza Province) and Tonco-Amblayo (Salta Province). Argentine official sources say that most uranium is recovered for about $20 per pound, with costs higher than that at Los Gigantes, where CNEA has said it is losing money. Argentine law stipulates that all uranium reserves are the exclusive property of CNEA, held and operated on behalf of the federal government.

At present, there are three operating uranium mines in Argentina.

1. *San Rafael* — Located near the Sierra Pintada orebody in Medoza Province, about 150 miles (250 km) south of the provincial capital of Mendoza, this mine produces uranium from heap leaching, with a current capacity of about 300,000 pounds U_3O_8 per year. 1987 production was approximately 140,000 pounds U_3O_8. Its heap-leaching recovery method probably is somewhat cheaper than conventional milling, but offers less efficient uranium recovery.

The government has decided to focus its future uranium production efforts on the Sierra Pintada orebody, and is considering expanding leaching capacity to about 650,000 pounds U_3O_8 per year. This orebody contains Argentina's largest uranium reserves — some 42 million pounds U_3O_8. Expansion of mining operations in the field was scheduled to begin in 1990, but now has been indefinitely deferred. In 1986, President Alfonsin reportedly approached Japan about financing and building a 1.8 million pounds U_3O_8 per year mine and mill at Sierra Pintada, to cost about $160 million. Whether the Japanese will help in this area has not been reported.

2. *Los Gigantes* — Los Gigantes is located in Cordoba Province, about 300 miles (500 km) northwest of Buenos Aires. The mine began producing uranium in late 1982, and is operated by Eduardo Sanchez Granel y Asociados, which sells its production to CNEA under a 15-year contract that specifies deliveries of 260,000 pounds U_3O_8 per year. Target 1987 production was 150,000 pounds, but it is estimated that about 90,000 pounds actually was produced. Since opening in December 1982, the mine's output has averaged about 115,000 pounds U_3O_8 per year, even though milling capacity is over 250,000 pounds per year. In late 1986 through early 1987, the operation was closed for several months due to charges by the Cordoba Provincial government that it was ignoring environmental regulations. The project probably will continue to produce at less than target levels until its contract expires in 1997, when it likely will be closed.

3. *La Estela* — This mine is in San Luis Province, about 400 miles (650 km) west of Buenos Aires. The provincial government recently signed an agreement with the CNEA giving the province a royalty income from the mine of about $2.4 million per year, or about 7.5 percent of Argentina's total uranium royalty earnings. 1987 production from the La Estela mine and mill was about 26,000 pounds U_3O_8.

The CNEA is concerned that Argentina's uranium production could greatly decrease after about 1990, when it is possible that the Los Gigantes and La Estela mines will have to close down after having exhausted their available resources, leaving only San Rafael in operation. The CNEA closed its 22-year-old Malargue mine and mill in southern Mendoza Province in 1986, and the Don Otto and Pichinan facilities (total capacity about 280,000 pounds per year) are no longer operating. The Don Otto facility includes a mill and several nearby mines, and is in the far northwest in Salta Province. The Pichinan mine and mill is in Patagonia, in Chubut Province, about 900 miles (1,500 km) southwest of Buenos Aires. This possibility of a further reduction of output in the near-term has made the option of enriching the natural uranium fuel loaded into its PHWRs increasingly attractive — even comparatively

* *Uranium Resources, Production and Demand*, prepared by the OECD Nuclear Energy Agency and the International Atomic Energy Agency, 1986.

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slight enrichment levels (0.85 to 1.2 percent U_{235}) could increase burnup in the reactors enough to conserve measurable amounts of uranium.

The Reactor Program

Nuclear-generated electricity accounted for about 11 percent of the total in 1985 and 1986. In addition to the two operating commercial units (and one under construction), Argentina also has four research reactors, and the government is studying proposals to build a 22-MWt isotope production reactor, designated RA-9. For commercial electricity production, Argentina appears firmly committed to the PHWR reactor type.

Argentina's first reactor was Atucha Unit 1, a KWU-designed 335-MWe (Net) PHWR that entered service in 1974. The Atucha complex is located at Zarate, about 45 miles (70 km) northwest of Buenos Aires. The reactor is used for daily load cycling, and through the end of 1986, its cumulative lifetime load factor was 71.5 percent. It uses approximately 300 MT of heavy water in its core, with a 27 tonne reserve. CNEA estimates that enriching the reactor's natural uranium fuel to 1.2 percent U_{235} would double the current burnup of 6,000 MW days per tonne.

In 1983, a second PHWR, a 600-MWe CANDU designed by AECL, went into operation at Embalse, near Cordoba. Lifetime cumulative load factor at the end of 1986 was 53.5 percent.

The second unit at the Atucha site (698-MWe net PHWR) currently is about half completed and is now tentatively scheduled to go into operation in 1993. The plant's architect/engineer is ENACE (Empresa Nuclear Argentina de Centrales Electricas) which is 25-percent owned by KWU and the remainder by the CNEA. The design was supplied by KWU.

The reactor's pressure vessel arrived on-site in March 1987. The main part of the vessel was forged in Japan by Mitsubishi Heavy Industries, and was then shipped to Rotterdam, Holland, where the 320-tonne cover dome from Spain was installed and final assembly was completed. The vessel is one of the largest ever made; it is 14.26 m in height, 8.44 m in diameter, has an average wall thickness of about 280 mm and weighs 997 tonnes.

Construction at the Atucha site has frequently been interrupted. Shortly after construction began in 1981, the economic crisis brought on by the Falklands War in 1982 caused delays, and between 1984 and 1986 construction virtually stopped. The project has suffered from the lack of a continuous funding commitment from the central government, and budgets have been approved only on a year-by-year basis. In May 1987, 6,500 workers occupied the worksite, protesting low wages and intermittent pay. A recent ENACE estimate put the final cost of the reactor at a minimum of $2.6 billion, excluding interest on the project-related loans, which could run as high as 30 percent of capital costs. The plant will import at least $900 million in equipment and services from abroad, primarily from the Federal Republic of Germany (FRG) through KWU.

Argentina also tentatively plans to build a PHWR of approximately 380 MWe in the mid to late-1990s at Hernandarias, in Entre Rios Province, northwest of Buenos Aires. There is considerable doubt that this planned unit will ever be built, given the lengthy and expensive delays in completing Atucha Unit 2. Current plans call for this to be the demonstration unit for Argentina's semi-indigenous "Argos" reactor design.

Even before any of these newly-designed reactors are built domestically, Argentina has been involved in marketing the Argos design abroad. The design is similar to Argentina's two Kraftwerk Union PHWRs and is reported to have a high degree of inherent safety. It's small capacity clearly defines its market as Third-World countries with small electricity grids and limited nuclear infrastructure. The price appears to be in the $1 billion range, and the design competes with Canada's Candu-300 and KWU's designs. Prospective customers certainly are aware that buying a reactor from Argentina would not put the customer into a restrictive safeguards environment, unlike the situation if a reactor was bought from Canada or the USA. Argentina has discussed its design with the governments of Algeria, Albania, and other countries that might be candidates for a reactor purchase.

Fuel Cycle Facilities

Enrichment — In 1983, Argentina revealed that it was building a pilot enrichment plant at Pilcaniyeu, 700 miles (1,150 km) southwest of Buenos Aires near the resort area of San Carlos de Bariloche. The plant's initial capacity is reported to be under 10,000 SWU per year; it uses gaseous diffusion technology. It is scheduled to begin operation in mid-1988, with an expansion to 20,000 SWU per year planned to begin in 1989. Funding for expansion to 100,000 SWU per year could be approved even before

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1989. The plant's cost is estimated to be approximately $200 million thus far.

The Argentine government had said for several years that the plant's target enrichment level was 20-percent U^{235}, but then in 1986, it announced that, due to economic restrictions, the target enrichment had been downgraded to only 2 percent. However, several other sources have been quoted as saying that the 20-percent figure remains correct, and that only international sensitivities to higher enrichment levels caused the government to modify its numbers. It is equally possible that unresolved technical problems may have forced down the initial enrichment target.

At a 20-percent enrichment level, 20,000 SWU could provide over 500 kilograms of enriched UF_6. This capacity also could provide nearly 40 tonnes of enriched UF_6 at the 1.2 percent sometimes quoted as a possible enrichment level for Argentina's PHWRs. Thus, Argentina could consume this amount of enrichment internally, but, because its reactors do not *require* enriched fuel, there is always the potential for export. How the enrichment capacity is to be used has not been reported.

The Pilcaniyeu project is under extremely tight security, and is accorded a high degree of priority at the central government level. The project also is important as an example of Argentine technical expertise and independence from larger countries. Several reasons have been given for this costly effort to achieve domestic enrichment capability:

1. Closing the fuel cycle would enable Argentina to end its dependence on outside suppliers for enrichment.
2. Domestic enrichment of Argentina's reactor fuel could preserve Argentina's uranium reserves.
3. Having enrichment capacity would allow Argentina to export unsafeguarded fuel for any reactors, commercial or research, that it (or others) might sell .
4. It would support fuel requirements (estimated at 30 kg per year of 20-percent enriched U^{235}) for its four research reactors.

Argentina reportedly has purchased enrichment services abroad, including a purchase in 1982 of 100 kg of uranium enriched to 20-percent U^{235} in the USSR. News reports from Buenos Aires also have claimed that Argentina has purchased unsafeguarded UF_6 from the People's Republic of China in the early 1980s, although CNEA denies this.

Reprocessing — CNEA is constructing a pilot reprocessing plant at Ezeiza, near Buenos Aires, which is over 80-percent complete. It uses technology acquired from Italy's Technint SpA. for basic engineering. The plant is scheduled for cold testing during the second half of 1988 and for hot-testing and initial use on spent fuel from Atucha-1 in 1989. Initially, the pilot plant's capacity will be 5 tonnes of spent fuel per year, recovering up to 15 kg of plutonium. At the end of 1986, Argentina reportedly had in storage approximately 4,200 spent fuel assemblies (containing about 1,700 kg of plutonium) taken from Atucha Unit 1 since 1974. The reprocessing plant will have a capacity of about 30 such assemblies per year.

Fuel Fabrication — A fuel fabrication unit also is being built at the Ezeiza facility, with zircaloy production scheduled for 1990. CNEA closed its pilot zirconium sponge plant in 1982 to concentrate on building a larger-scale unit. A UO_2 plant is in operation in Cordoba Province, apparently processing all domestic U_3O_8 for fabrication. In 1984, Argentina reportedly sold Romania fuel fabrication machinery to be used with Romania's CANDU reactors.

Heavy Water — Argentina currently has a pilot heavy water (D_2O) production plant under construction at Zarate, site of the Atucha reactors, and a full-scale plant at Arroyito, in Neuquen Province. The Zarate plant, with a capacity of 2 to 8 tonnes per year, has been under construction since the mid-1970s, and it is scheduled to begin operation in mid-1988, using the water-hydrogen sulfide ion exchange process, at an estimated cost of $100 million. It does not operate under any IAEA or other safeguards. The plant is intended as a demonstration unit; the design will be upgraded to the 80 tonne per year range, so that it can eventually be exported.

The contract for the Arroyito facility was signed with Sulzer Bros. of Switzerland in 1980, and totaled approximately $300 million at the time. The cost now reportedly is more than double the original figure. Sulzer hopes to finish the twin 125 tonnes-per-year production lines in 1988, with production beginning in mid-1989. Capacity will be about 100 tonnes for the first year, rising to about 150 tonnes the second year, and averaging about 200 tonnes thereafter. The plant includes an ammonia production facility to feed the monothermal exchange process. The facility will be operated under safeguards.

Argentina's commerce in heavy water has captured the attention of the nuclear press on several occasions over the past few years. In 1983, Argentina reportedly bought about

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5 tonnes of unsafeguarded heavy water from China. There were reports that the material did not meet required specifications for isotopic purity, but that Argentina has kept it for additional purification in a production plant, when one comes into operation. Also in 1983, the Reagan administration approved the sale from the US Government to Argentina of approximately 40 tonnes (of the roughly 140 tonnes available) of heavy water which was several decades old. In 1986, China sold two tonnes of heavy water to Argentina, this time under full safeguards, for a price of around $245 per kg. The Embalse reactor's core, for example, requires 468 tonnes of heavy water.

Nuclear Trade and International Cooperation

Brazil — Over the last several years Argentina and Brazil have made considerable progress in defining areas of mutual nuclear-industry cooperation, and have used the potential for such cooperation to try to diffuse traditional tensions between the two countries. Argentine President Raul Alfonsin and Brazilian President Jose Sarney first agreed on limited nuclear cooperation in 1985. Then, in January 1987, executives from Argentina's ENACE and Brazil's Nuclen (the construction subsidiary of Nuclebras) signed an agreement to cooperate in such areas as fuel management, nuclear plant design and engineering, and related services.

This type of agreement was designed to stimulate closer ties between the two countries in the nuclear arena. Both companies are quasi-governmental organizations with a common link in that KWU is a 25-percent owner in each. KWU exerts considerable influence because it manages the technology transfer to the nuclear projects undertaken by both government-owned companies.

In March 1987, a representative of Brazil's CNEN (Commissao Nacional de Energia Nuclear) announced that Brazil and Argentina had agreed in principle to cooperate on long-term development of a small fast breeder reactor. At about the same time, the two countries began discussing the possibilities for cooperation on development of a reactor to power nuclear submarines. Such cooperation could greatly enhance communication between the militaries of both countries.

In April 1987, representatives of the two countries conducted high-level political and technical discussions in Rio de Janiero, covering a wide range of topics. As a result of those talks, Argentina's Alfonsin invited President Sarney to visit Argentina's Pilcaniyeu enrichment plant. The Brazilian President's visit to Pilcaniyeu in July made him only the second foreigner known to have visited the facility; the other visit was by IAEA Director General Hans Blix, who toured the facility shortly after its existence was announced in November 1983. As a result of Sarney's visit, trust between the two countries' presidents appears to have increased, even though Alfonsin was attacked in certain circles for having compromised Argentine proprietary enrichment technology. Brazil is thought to be at least five years behind Argentina in indigenous, unsafeguarded fuel cycle technology, particularly enrichment.

Following Sarney's visit to Argentina, Alfonsin announced that Argentina would supply low and medium-enriched uranium to Brazil sometime later in the 1980s, which Brazil would use to fuel its Angra-1 reactor and one or more of its research reactors. This announcement served as a tacit acknowledgement of Brazil's inability to provide the necessary enrichment levels from its own domestic enrichment facilities. However, only a few days later, Brazil proposed supplying Argentina with an unspecified amount of slightly-enriched uranium (0.85 percent U_{235}) from its Rezende jet-nozzle enrichment plant, which is under safeguards through an arrangement with West Germany. The material would be used to increase burnup at the Atucha-1 reactor.

Canada — Until fairly recently, Argentina maintained close ties with Canada's AECL, which supplied the 600-MWe Candu reactor at Embalse that has been operating since 1983. In 1978, Canada lost the bid to provide the second unit at the Atucha station to KWU, even though Argentina reportedly preferred the CANDU design because it was better suited to local fabrication. Argentina had insisted on using local companies to produce at least part of the plant equipment. Canada's Ministry of External Affairs had required full-scope safeguards conditions that the Argentine government did not accept, such as Argentina's signing the Nuclear Non-Proliferation Treaty. In addition, Canada would not permit re-export of the pressure-tube reactor design (a condition agreed to by KWU in supplying Atucha Unit 2). Canada's stringent safeguards requirements continue to limit cooperation between the two countries.

Although AECL has continued to supply heavy water and parts for Embalse, the Canadian government has not thus far been willing to modify its regulations so as to permit the possibility of additional CANDU sales to Argentina. As recently as November 1987, discussions over a possible Argentine purchase of Canadian uranium, as well as other

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nuclear trade, were canceled when it became obvious that Canada's stance would not be acceptable to Argentina.

Federal Republic of Germany — Argentina has developed a close relationship with the FRG in the area of nuclear power. Kraftwerk Union is a one-fourth partner in ENACE, which is the project manager for Atucha Unit 2, designed and partially supplied by KWU. The lengthy construction delays at Atucha Unit 2 have strained the relationship with KWU, due in part to contract renegotiations concerning Argentina's role in fabricating equipment, and also over the need for KWU to provide additional loans to keep the project moving, however slowly. Argentina has admitted the need to have a "long-term partner" that will provide technology transfer and help with export-related opportunities. Despite frustrations, the FRG and KWU appear to have assumed that role.

Iran — Argentina's continuing talks with the government of Iran over nuclear issues and possible construction arrangements have received considerable attention in the more established nuclear nations. The two countries have discussed Argentina's possibly helping to rebuild Iran's single research reactor, potentially supplying another research unit, and possibly helping finish construction of Iran's never-completed Bushehr reactor. The research unit is a safeguarded 5-MWt pool-type, water-moderated unit originally supplied by the USA, which uses 93-percent enriched uranium. Argentina's relationship with Iran's Atomic Energy Organization has been of growing concern not only to nuclear observers in Washington, but to some nuclear industry personnel in Argentina as well.

In May 1987, Argentina reportedly signed a nuclear cooperation agreement with Iran that included an agreement to supply a new core for the research reactor, a contract worth about $5 million to Invap (Investigaciones Aplicadas, half-owned by the CNEA and half by the Rio Negro provincial government), the company responsible for construction of the Pilcaniyeu enrichment plant. The supply deal involves fuel enriched to 20-percent U^{235} and some training of Iranian personnel in Argentina.

Argentina had for some time previously been reported as one of the partners in a West German (KWU)-Spanish-Argentine consortium bidding to complete work on the Bushehr reactor, and Argentine technicians have visited the Bushehr site. In November 1987, President Alfonsin reportedly approved the Argentine involvement in bidding for nuclear equipment and services supply contracts with Iran. However, Iraq's recent bombings of the Bushehr reactor now have curtailed any near-term plans to resume construction at Bushehr.

Peru — Since 1978, CNEA has acted as project manager at the Peruvian Huarangal Nuclear Complex near Lima, now scheduled to begin operating in 1988. CNEA designed and built a 10-MWt pool-type reactor for isotope production, and a zero-power research reactor. The complex will produce radioisotopes for medicine and agriculture, including food irradiation. Between 1982 and 1986, the project was largely interrupted by political turbulence in both countries. The Peruvian isotope production reactor will use 40-kg core loads of 20-percent enriched fuel, to be supplied by Argentina from the Pilcaniyeu plant. The fuel for the initial core was enriched in the FRG from Argentine uranium.

Algeria and Albania — Argentina has met with Algerian representatives concerning possible sale of Argentina's Argos PHWR design. In May 1985, Algeria reportedly purchased a 500-KWt research reactor from an Argentine consortium led by Invap and CNEA, along with 1,500 kgs of UO_2 in January 1986 for a research unit near Algiers. Algeria also has been negotiating with Argentina over a planned radioisotope production plant and other nuclear-related service work. It is unlikely that any decision by Algeria to buy the commercial PHWR will be taken before about 1990. It has been reported that CNEA personnel have been helping explore for uranium in Algeria.

Argentina also has actively pursued discussions with Albania, aimed at supplying that country with a 5-MWt research reactor and associated fuel supplies and other services. Thus far, no contracts are known to have been agreed on, and talks are continuing.

Conclusion

Although Argentina's reactor program includes only two operating reactors, with one unit under construction, the country has made great efforts to develop a complete fuel cycle capability, and could in the future become exporters of nuclear technology and services. Its relations with other nuclear-industry countries have been based on Argentina's philosophy of "nuclear independence," which has somewhat limited trade between Argentina and some other nations.

Argentina's uranium production capacity has fallen slightly below its reactor requirements in recent years, and further investment in production is likely to be needed if it is to continue to be self-sufficient in uranium. Any investment will probably be made at the Sierra Pintada orebody, near the currently-producing San Rafael mine and mill in Mendoza Province.

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REACTORS ENTERING SERVICE IN 1987

Introduction

During 1987, 26 reactors entered commercial operation, in 10 countries, totaling approximately 26,500 MWe net capacity. Table 1 shows the additions, by country. In the USA, 7 reactors entered service, followed by the USSR and France, with 5 and 4 reactors, respectively.

It should be noted that differences in how "commercial operation" is defined, between different countries, or even states in the USA, makes it difficult to accurately state when a particular unit has entered service. In some cases, reactors may be connected to electricity grids for some time before being declared in commercial operation, while in other cases, a unit's status under Public Utility Commission or other regulatory structures might be the determining factor. The following presents a summary of the best information available to Nuexco at the beginning of 1988.

Bulgaria

Bulgaria's **Kozloduy Unit 5** (1,000 MWe) began operating in October 1987. This unit is the first of the new series VVER-1000 PWRs to be completed outside the USSR, and the entry of this reactor will raise Bulgaria's share of nuclear-generated electricity to about 40 percent of the total. The Kozloduy site already had 4 VVER-440 reactors in operation, and the sixth unit, a 1,000-MWe unit virtually identical to Unit 5 is in an advanced stage of construction and is scheduled to begin operating in 1988.

Canada

Ontario Hydro's **Bruce Unit 8**, a 837-MWe CANDU reactor, entered service in May 1987, slightly ahead of schedule. The entry of this unit into operation completes the reactor construction program at the Bruce site, which now has a total gross generating capacity of over 6,000 MWe. Until it was briefly shut down in August 1987 due to a heavy water leak, Bruce Unit 5 had operated continuously for 475 days.

Pickering Unit 1, which had been shut down since March 1984 for retubing, returned to service in October 1987. **Pickering Unit 2**, which also had been closed for retubing, is expected to re-enter service in May 1988. The retubing project on the two reactors was required after Unit 2 suffered a tube rupture, caused by hydride blisters forming in the zirconium pressure tubes. Pickering Units 1 and 2 were the only units in Canada whose pressure tubes were made of that material.

With the completion of Bruce Unit 8, Canada's remaining reactor construction program consists of Ontario Hydro's four Darlington reactors (all 880-MWe CANDUs), scheduled to begin operation in 1989 through 1992.

Czechoslovakia

Czechoslovakia's eighth reactor, **Dukovany Unit 4** (440-MWe PWR) began full operation in October 1987, after undergoing testing since April. All of the country's reactors are the Soviet VVER-440 model, and four additional units are under construction.

France

In France, four reactors entered commercial service in 1987, while four others were connected to the electricity grid but had not formally been declared commercial. **Chinon Unit B3**, the 33rd of the 870-MWe PWR series, began commercial operation in March, and **Cattenom Unit 1** (1,265-MWe) entered commercial service in April. **Flamanville Unit 2** (1,290-MWe) and **Saint Alban Unit 2** (1,300-MWe) also were declared in commercial operation in 1987. These four reactors are considered by Electricite de France (EdF) to have been 1986 connections, but there is a 9 to 12 month delay in achieving what the utility considers commercial operation.

In addition, **Chinon Unit B4** (870-MWe), **Cattenom Unit 2**, **Belleville Unit 1** and **Nogent Sur Seine Unit 1** (all 1,265-MWe PWRs) were connected to the grid in 1987. The startup of the Belleville reactor marked France's 50th commercial nuclear reactor coming into service. **Chinon Unit A3**, which had been out of operation for repairs since May 1984, began generating electricity in December. Currently, there are ten reactors under construction in France, scheduled to begin operating between 1988 and 1993. EdF has not announced any plans to order additional reactors in 1988.

Federal Republic of Germany

The 300-MWe **Thorium High-Temperature Reactor**

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ANALYSIS AND COMMENTARY

Table 1

NUCLEAR UNITS ENTERING COMMERCIAL OPERATION DURING 1987[1]

Country/Unit	Utility or Owner	MWe (Net)	Type
Bulgaria			
Kozloduy 5	Electroenergetica	1,000	PWR
Canada			
Bruce 8	Ontario Hydro	837	PHWR
Czechoslovakia			
Dukovany 4	Fed. Ministry for Fuels and Energy	440	PWR
France			
Cattenom 1	Electricite de France	1,265	PWR
Chinon B3	Electricite de France	870	PWR
Flamanville 2	Electricite de France	1,290	PWR
Saint Alban 2	Electricite de France	1,300	PWR
Also connected to the grid in 1987:			
Belleville 1	Electricite de France	1,275	PWR
Cattenom 2	Electricite de France	1,265	PWR
Chinon B4	Electricite de France	870	PWR
Nogent-sur-Seine 1	Electricite de France	1,275	PWR
Subtotal		9,410	
Federal Republic of Germany			
Muelheim-Kaerlich	RWE	1,227	PWR
THTR-300	Hochtemperatur-Kernkraftwerk GmbH	300	HTGR
Subtotal		1,527	
Hungary			
Paks 4	Hungarian Electric Works	440	PWR
Japan			
Fukushima II-4	Tokyo Electric Power Co.	1,067	PWR
Hamaoka 3	Chubu Electric Power Co.	1,066	BWR
Tsuruga 2	Japan Atomic Power Co.	1,115	PWR
Subtotal		3,248	

[1]Sources: IAEA, utility companies, and published sources.

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Table 1 (Cont.)

NUCLEAR UNITS ENTERING COMMERCIAL OPERATION DURING 1987

Country/Unit	Utility or Owner	MWe (Net)	Type
South Korea			
KNU 8 (Yongkwang 2)	Korea Electric Power Co.	900	PWR
USA			
Harris	Carolina Power and Light Co.	900	PWR
Vogtle 1	Georgia Power Co.	1,100	PWR
Braidwood 1	Commonwealth Edison Co.	1,120	PWR
Byron 2	Commonwealth Edison Co.	1,120	PWR
Perry 1	Cleveland Electric Illuminating Co.	1,205	BWR
Beaver Valley 2	Duquesne Light Co.	833	PWR
Clinton 1	Illinois Power Co.	933	BWR
Subtotal		7,211	
USSR			
Balakovo 2	Minpower	1,000	PWR
Ignalina 2	Minpower	1,500	RBMK
Kalinin 2	Minpower	1,000	PWR
Rovno 3	Minpower	1,000	PWR
Zaporozhye 3	Minpower	1,000	PWR
Subtotal		5,500	
TOTAL Net MWe		**30,513**	

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(THTR-300) in Hamm-Uentrop, owned by a consortium of utilities and other German companies, was formally accepted by its owners and began commercial operation in June 1987. The reactor had generated more then one billion kilowatt-hours since November 1985 during its testing period, prior to commercial operation. RWE's (Rheinisch-Westfaelisches Elektrizitaetswerk AG) **Muelheim-Kaerlich** plant (1,227-MWe PWR) also began commercial operation in mid-1987.

Hungary

Hungary's **Paks Unit 4** (440-MWe PWR) entered commercial operation at the end of October 1987, completing the reactor construction program at the Paks site, which now has four VVER-440 PWRs, supplied by the USSR, operating there. Construction of two VVER-1000 units is scheduled to begin in 1988.

Japan

Three reactors began operation in Japan in 1987. In February, Japan Atomic Power Company's (JAPC) **Tsuruga Unit 2** (1,115-MWe PWR) officially entered service. In August, Chubu Electric Power Company's **Hamaoka Unit 3** (1,066-MWe BWR) began operating. Tokyo Electric Power Company's (TEPCO) **Fukushima Unit II-4** (1,067-MWe PWR) was the last unit to enter commercial service in 1987, bringing Japan's nuclear capacity to 35 units, with a total nuclear generating capacity of 25,850 net MWe.

TEPCO placed orders for two additional units in 1987. The units are advanced 1,350-MWe BWRs jointly developed by General Electric Corp. and its licensees Hitachi Ltd. and Toshiba Corp.

South Korea

Korea Nuclear Unit 8 (KNU-8), a 900-MWe PWR, entered commercial service in June 1987. This unit is now called Yongkwang Unit 2. With this reactor's contribution, South Korea's seven nuclear plants constitute over 30 percent of the total electrical capacity. Korea Electric Power Company (KEPCO) placed one of the few orders for new nuclear plants in 1987. The company signed contracts in April for Units 3 and 4 at the Yongkwang site (also called KNU 11 and 12).

USA

Seven reactors entered commercial service in the USA in 1987, adding over 7,000 MWe of installed capacity to the US nuclear generating base (Table 1). By the end of the year, four other reactors had received full-power licenses, and one had received a low-power license, but none of those units entered commercial operation. This compares favorably to the progress made in 1985 and 1986, in which eight new units entered service in each year.

Commonwealth Edison Company's **Byron Unit 2** (1,120-MWe PWR) formally entered service in April 1987, almost two months ahead of schedule. The company's **Braidwood Unit 1** (1,120-MWe PWR) also began operating in April 1987, although it has not been formally declared to be in "commercial operation" under the Illinois Commerce Commission's (ICC) definition of the term. The ICC had earlier approved the plant's operation.

Also in April, Illinois Power Company's **Clinton Unit 1** (933-MWe General Electric BWR) was connected to the power grid, beginning power ascension and testing. The unit was actually placed in service in November, although, as in the case of Braidwood Unit 1, the ICC had not formally granted it commercial status.

Carolina Power & Light Company's **Shearon Harris Unit 1** (900-MWe Westinghouse PWR) was declared to be in commercial operation at the beginning of May 1987. The plant's construction cost reached $3.8 billion, and it is the only unit to be constructed at that site, after three other units initially planned for the site were canceled several years earlier.

Duquesne Light Company's **Beaver Valley Unit 2** (833-MWe PWR) entered service in November 1987, having the distinction of being the first US reactor to be granted a full power license without a direct public vote by the NRC commissioners, since the accident at Three Mile Island in 1978.

Cleveland Electric Illuminating Company's **Perry Unit 1** (1,205-MWe BWR) also entered service in November. The unit had been completed since January 1987, but the occurrence of an earthquake near the plant site caused an intervention in the NRC proceedings, delaying licensing until November.

Georgia Power Company's **Vogtle Unit 1** (1,100-MWe PWR) entered commercial operation at the end of May 1987. Construction of the unit began in 1974, and the total cost of the two-unit plant (Unit 2 is scheduled to begin

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operation in 1988) is nearly $9 billion.

The US nuclear backlog continues to shrink, and, excluding units that are either held up by regulatory or legal problems (such as Seabrook and Shoreham), or are considered indefinitely deferred, there are only seven reactors left under active construction that have not yet received at least fuel-loading licenses. Ten reactors remain either deferred or officially still on order.

USSR

Five reactors began operating in the USSR in 1987. **Ignalina Unit 2** (1,500-MWe RBMK) entered service in August, the only RBMK model reactor to do so in 1987. In addition, **Balakovo Unit 2, Kalinin Unit 2 , Rovno Unit 3**, and **Zaporozhye Unit 3** (all VVER-1000 model 1,000-MWe PWRs) also were completed and began operating.

At present it appears that the USSR will not complete Chernobyl Units 5 and 6. The two units were deleted from the latest five-year plan.

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RECENT DEVELOPMENTS

USA

Changes in DOE's High-Level Waste Program

The search for an acceptable repository for high-level nuclear wastes in the USA may be nearing resolution, with the US Congress deciding on Yucca Mountain, Nevada as the probable site. In December 1987, members of key committees of the US House of Representatives and Senate agreed on a compromise package of amendments to the Nuclear Waste Policy Act (NWPA) that creates major changes in the US high-level waste disposal program, managed by DOE. President Reagan signed the bill on December 22, 1987.

The compromise, which is part of the FY1988 budget reconciliation bill, focuses DOE's efforts on the Yucca Mountain site, and directs DOE to cease site characterization work at the remaining two candidate sites — Hanford, Washington and Deaf Smith County, Texas. In the event that the Yucca Mountain site proves unsuitable, DOE is to cease work there and report its findings back to Congress.

The new legislation offers certain financial incentives for the state agreeing to accept the repository site (in this case, Nevada, should it accept) — the state will receive $10 million per year for accepting the facility, increasing to $20 million upon receipt of spent fuel. A unique provision offers "special consideration" to Nevada in competing for federal research projects if it agrees to accept the repository.

In addition, the bill authorizes construction of a Monitored Retrievable Storage (MRS) facility, but with conditions that make it impossible for an MRS to assume the role of a *de facto* waste repository. The MRS would store and package high-level nuclear waste before shipping it to a permanent repository. Authorization for construction of the MRS will only take place after the Nuclear Regulatory Commission (NRC) licenses the permanent repository, preventing the MRS from acting as a substitute for a permanent facility. Should construction at the permanent repository stop, or the facility lose its license, the MRS would lose its authorization. MRS capacity will be limited to 15,000 metric tons of spent fuel.

The bill outlines a plan to appoint a negotiator empowered to negotiate arrangements for both the permanent repository and the MRS sites, who will try to find a state willing to voluntarily accept the MRS. DOE's earlier decision to make Oak Ridge, Tennessee the MRS site is no longer effective — DOE must again begin its survey of acceptable sites, including the Oak Ridge site. A state will be eligible to recieve $5 million per year for agreeing to accept the MRS, increasing to $10 million per year when spent fuel is actually delivered there.

The compromise in Congress has created both antagonism and pessimism in Nevada. Some Nevada officials believe that the state has sufficient evidence to prove the site unsuitable, but fear that political pressure from Washington, D.C. will force DOE to arrive at a conclusion of suitability regardless of the "facts."

One of the most contentious issues involves interpretation of the Site Characterization, a massive effort to document the physical conditions of the repository, which is designed to provide the information for a determination of suitability or non-suitability. In January, DOE released a "consultation draft" of the Site Characterization Plan (SCP), summarizing the 7,000-plus pages of the actual document.

A prime concern of scientists is the rate of groundwater migration through the rocks at the site. Since at this site the water table is about 1,000 ft. (300 m) below the proposed level of the facility (about 1,200 ft., or 370 m), the rate of percolation of water downward through the dry rocks lying above the repository must be slow enough not to affect the radioactive materials being stored. The Site Charcterization will focus on obtaining the information to document (or estimate) any potential water flow or other problems.

Since the compromise legislation was announced, activists opposed to the NWPA repository, wherever it may be located, have had to re-assess their options for blocking it. It is unclear which, and how many, of the existing lawsuits aimed at stopping the project will be affected by the recent amendments to the NWPA, but many of those court challenges will be made moot by the Congressional action. It is also likely that new legal challenges will be mounted. With both the national environmentalist opposition and many Nevada legislators now able to focus their resources on blocking approval of only one site, intense opposition may be anticipated.

Narrowing the site selection process to Yucca Mountain already has led to economic slowdowns at the Hanford and Texas sites, where the site characterization phases had resulted in major economic windfalls in those areas. The area surrounding the Deaf Smith County, Texas site, particularly, had been in a recession, and the multi-year, several-billion dollar preliminary site analysis had provided hope for some renewed employment and a boost to the local

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economy. DOE is in the process of closing down its operations at both of the now-unnecessary sites.

The recent amendments to the NWPA appear, at least for now, to have resolved the impasse in the attempt to find a solution to the nation's high-level nuclear waste accumulation, expected to exceed 40,000 tonnes of spent fuel by the year 2000. Whether the Nevada site will prove suitable, and whether legal challenges to the program can stall its progress and final implementation, will take considerable time to resolve. Although uncertainties remain, Congress has taken a significant step forward in nuclear waste policy.

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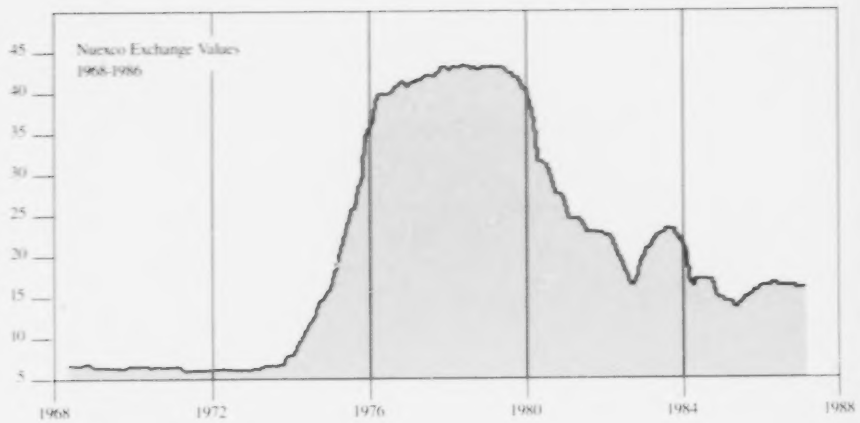
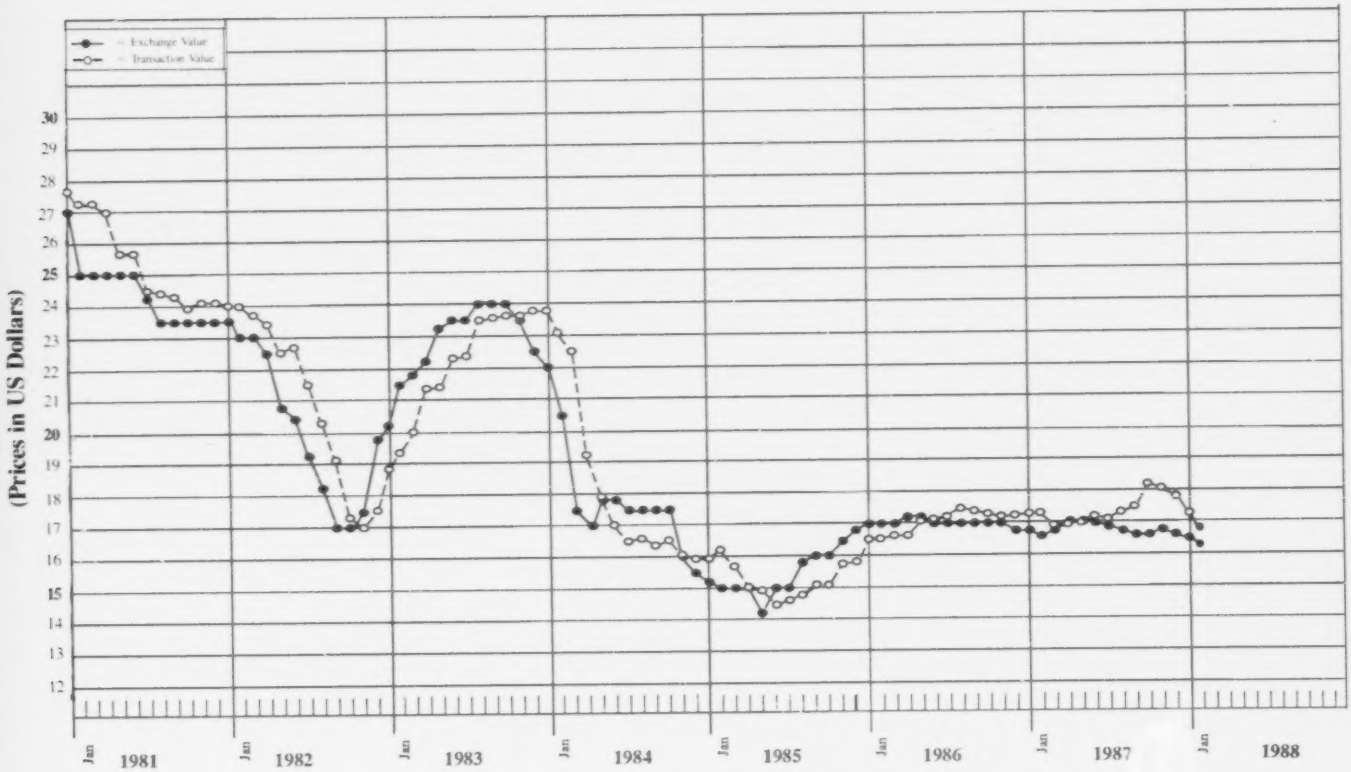
HISTORICAL MARKET DATA





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HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969		6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	**16.30**											

HISTORICAL US PREMIUM (Relative to the Exchange Value)

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	**0.70**											

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.30	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.05	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	**16.85**											

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HISTORICAL MARKET DATA

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	**1.90**											

HISTORICAL UF_6 VALUES

Determined as of the last day of the month indicated (US Dollars/kg. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	**46.50**											

HISTORICAL US UF_6 PREMIUM (Relative to the UF_6 Value)

Determined as of the last day of the month indicated (US Dollars/kg. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	**1.25**											

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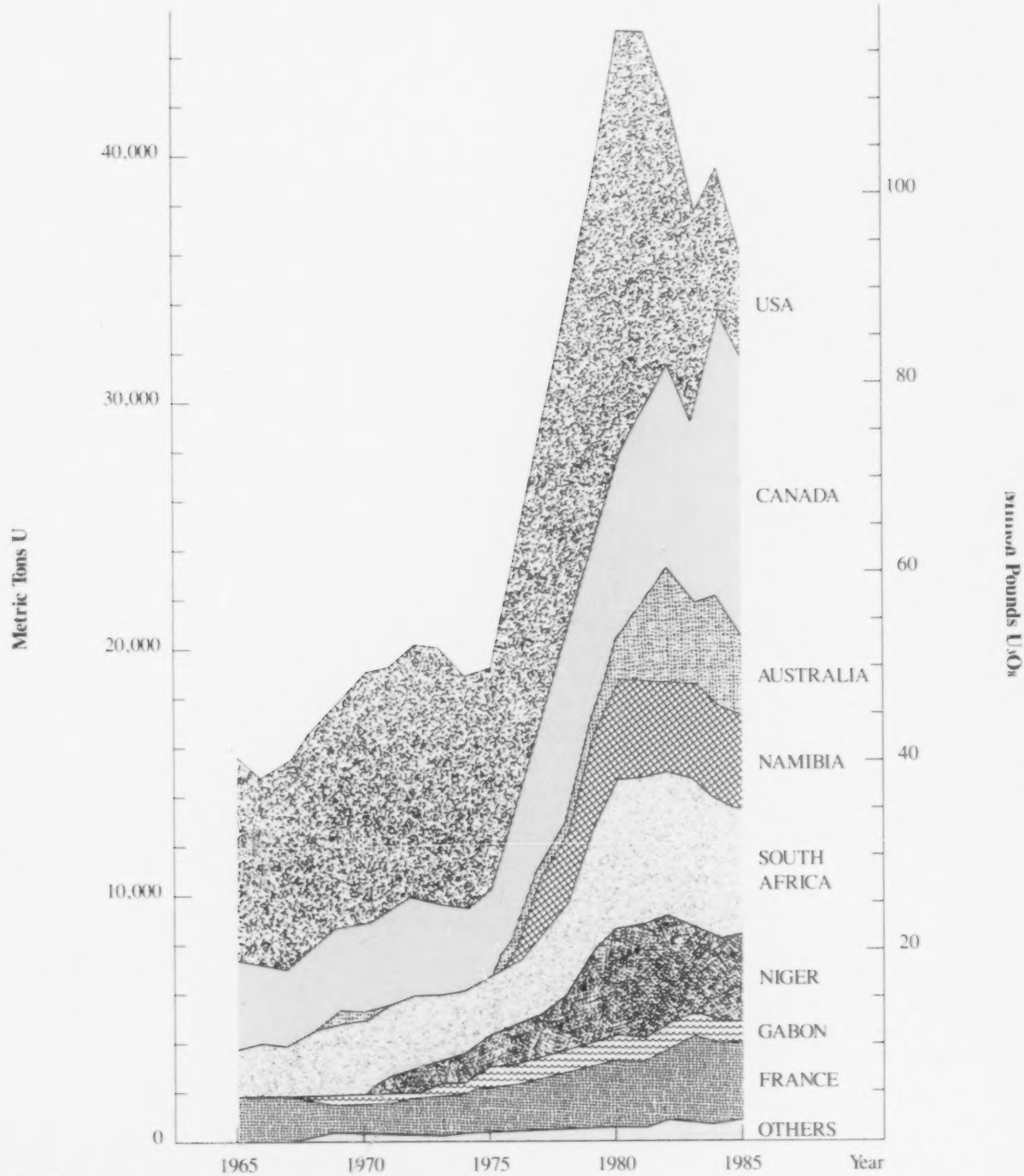
HISTORICAL MARKET DATA

HISTORICAL WOCA[1] URANIUM PRODUCTION[2]
(Compiled by OECD/IAEA Joint Report[3])



[1]WOCA = World Outside of Centrally-planned Economic Areas.

[2]1985 production data are preliminary.

[3]A joint report issued biennially by the OECD Nuclear Energy Agency and the International Atomic Energy Agency.

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HISTORICAL MARKET DATA

US URANIUM MARKETING ACTIVITIES STATISTICS[1]
(Compiled from data published by the US Energy Information Administration)

Year	Total Production[2] (million pounds U_3O_8)	Deliveries to Domestic Utilities[3] (million pounds U_3O_8)	Average Price of Delivered Uranium ($/lb. U_3O_8)	Quantity of Uranium Imported[4] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	n/a	n/a	3.6	n/a	1.2
1977	29.9	n/a	n/a	5.6	n/a	4.0
1978	37.0	n/a	n/a	5.2	n/a	6.8
1979	37.5	33.0[5]	$23.85[5]	3.0	n/a	6.2
1980	43.7	35.0[5]	$28.15[5]	3.6	$43.10	5.8
1981	38.5	32.6[5]	$34.65[5]	6.6	$32.90	4.4
1982	26.9	27.1	$38.37	17.1	$27.23[6]	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6

[1]Sources: 1979: US Department of Energy, Assistant Secretary for Resource Applications, Office of Uranium Rresources and Enrichment, *Survey of United States Uranium Marketing Activity*, DOE/RA-0053 (Washington DC, July 1980). 1980-1981: US Department of Energy, ASsistant Secretary for Nuclear Energy, Office of Uranium Enrichment and Assessment, *Survey of United States Marketing Activity*, DOE/NE-0013 and DOE/NE-0013/1 (Washington DC, June 1981 and July 1982). 1982: Energy Information Administration, *1982 Survey of United States Marketing Activity*, DOE/EIA-0403 (Washington DC, September 1983). 1983: Energy Information Administration, *Survey of United States Marketing Activity 1983*, DOE/EIA-0403(83) (Washington DC, August 1984). 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[2]Sources: 1976-11982: US Department of Energy, Grand Junction Area Office, *Statistical Data of the Uranium Industry*, GJO-100 (Grand Junction, Colorado, January 1983). 1983: Calculated by the staff of the Nuclear and Alternate Fuels Division, Office of Coal, Nuclear, Electric and Alternate Fuels, Energy Information Administration, from US Department of Energy, Grand Junction Area Office data files. 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[3]Excludes direct imports by domestic utilities.

[4]Includes imports by domestic utilities and domestic suppliers.

[5]Includes delivery commitments to domestic utilities and agents.

[6]Computation of quantity-weighted average price excludes the quantity associated with a large exchange (swap) transaction that occurred in 1982.

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VOLUME AND PRICE OF URANIUM DELIVERIES TO THE EUROPEAN COMMUNITY[1]
(Compiled from data published by the Euratom Supply Agency)

Year	Volume of Deliveries to the EC[2] (in MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts[3,4]		Spot Contracts[3,4]	
			Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8	Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75

[1]The twelve European Community member nations are Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

[2]The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3]For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar.

[4]Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

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GOVERNMENT STATISTICS

AUSTRALIA

		Consumer Price Index[1] (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups[2] (1984/1985 = 100)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates[3] (June 1976=100)
1975	Avg.[4]	57.9	36.3	82.1
1976	Avg.	65.7	40.7	99.7
1977	Avg.	73.8	46.3	110.8
1978	Avg.	79.7	52.0	117.7
1979	Avg.	86.9	69.5	127.9
1980	Avg.	95.8	83.1	140.8
1981	Avg.	105.0	85.9	154.1
1982	Avg.	116.7	89.0	174.9
1983	Avg.	128.5	96.9	181.9
1984	Avg.	133.6	98.0	194.4
1985	Avg.	142.6	107.3	202.7
1986	Avg.	155.5	101.5	213.0
Jan	1987	—	106.2	215.9
Feb	1987	—	108.9	216.5
Mar	1987	164.7	108.4	222.2
Apr	1987	—	108.3	222.2
May	1987	—	108.1	222.0
June	1987	167.2	108.1	221.8
July	1987	—	108.7	221.1
Aug	1987	—	110.5	222.3
Sep	1987	170.0	109.3	223.1

P = Preliminary R = Revised since last month

[1]Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 =100.0). Figures shown at end of quarter represent quarterly average.

[2]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).

[3]Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

[4]Monthly data for the period 1967 to 1986 appear in Report 233.

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CANADA

				Wage-earner Data: Average Hourly Earnings (C$)[2]				
		Industrial Products Price Index: All Commodities[1] (1981 = 100)	Consumer Price Index: All Items (1981 = 100)	Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)
1979	Avg.	80.0	80.7	—	—	—	—	—
1980	Avg.	90.7	88.9	—	—	—	—	—
1981	Avg.	100.0	100.0	—	—	—	—	—
1982	Avg.	106.7	110.8	—	—	—	—	—
1983	Avg.	110.4	117.2	17.22	—	14.18	10.67	11.10
1984	Avg.	115.4	122.3	17.89	—	14.97	11.11	11.68
1985	Avg.	118.6	127.2	18.53	16.48	15.56	11.85	12.12
1986	Avg.	119.6	132.4	19.38	16.70	15.76	12.28	12.58
Jan	1987	120.0	135.2	19.53	16.93	16.03	12.58	12.89
Feb	1987	119.8	135.8	20.33	17.20	16.21	12.66	13.11
Mar	1986	120.4	136.4	20.04	17.14	16.15	12.58	13.02
Apr	1987	121.2	137.0	20.47	17.38	16.26	11.99	13.27
May	1987	122.0	137.8	20.50	17.12	15.96	11.44	13.19
June	1987	122.5	138.2	20.23	16.94	15.70	12.77	12.88
July	1987	123.1	139.2	19.75	16.73	15.63	12.52	12.98
Aug	1987	123.7	139.3	19.64	16.98	15.87	12.65	13.03
Sep	1987	124.0	139.3	19.85	17.20	16.25	12.57	13.40
Oct	1987	124.3	139.8	20.06	17.31R	16.33R	13.01R	13.37R
Nov	1987	125.0	140.4	20.47P	17.45P	16.46P	12.45P	13.41P
Dec	1987	124.9	140.5	—	—	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1986 is found in Report 233.
[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1986 is found in Report 233.
[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."

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GOVERNMENT STATISTICS

REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1980 = 100)[4]	Producer Price Index All Groups[5] (1980 = 100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1975	Avg.	16.71	—	157.2	100.0	639,473	1,003,617
1976	Avg.[7]	19.30	—	174.7	115.1	671,240	1,212,983
1977	Avg.[7]	23.87	—	194.4	130.0	712,006	1,420,670
1978	Avg.[7]	27.14	—	137.2	142.7	664,571	1,537,169
1979	Avg.	30.18	—	155.3	164.5	692,209	1,830,632
1980	Avg.[8]	35.53	—	176.7	192.1	714,379	2,279,615
1981	Avg.	41.89	—	206.5	218.3	728,506	2,820,505
1982	Avg.[9]	47.25	104.2	233.5	248.7	707,552	3,246,071
1983	Avg.	51.88	115.0	262.2	274.8	696,579	3,644,772
1984	Avg.	58.95	130.3	292.8	297.9	712,080	4,196,764
1985	Avg.	68.76	151.6	192.6	181.2	726,804	396,956
1986	Avg.	80.18	177.9	228.5	216.6	757,218	480,956
Jan	1987	—	—	248.3	233.9	740,031	532,577
Feb	1987	—	—	251.0	237.0	757,872	598,986
Mar	1987	88.17	197.1	255.0	239.6	762,697	536,006
Apr	1987	—	—	258.2	242.5	761,850	533,487
May	1987	—	—	261.2	243.6	759,421R	530,981
Jun	1987	90.74	203.5	263.1	244.9	759,433	573,546
July	1987	—	—	266.2	246.8	681,409	566,232
Aug	1987	—	—	270.0	249.9	—	—
Sep	1987	100.79	224.7	273.4	252.4	—	—
Oct	1987	—	—	276.5	255.5	—	—
Nov	1987	—	—	144.8[10]	—	—	—

P = Preliminary R = Revised since last month

[1]Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Republic of South Africa Department of Statistics, Pretoria: "Government Gazette: Consumer Price Index for Urban Areas."

[4]The basis for calculation prior to January 1985, 1975 = 100. For annual averages prior to 1978, April 1970 = 100.

[5]Previously known as the Wholesale Price Index, now the Producer Price Index. The computation remains the same. The basis for calculation prior to January 1985, 1975 = 100.

[6]Bulletin of Statistics, Department of Statistics, Pretoria.

[7]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Report 140.

[8]Monthly data for Codes 35 and 40, 1977-1980, appear on page 28 of Report 157

[9]Monthly data for 1979-82 appear on page 39 of Report 184.

[10]New base for November. To convert to old base, multiply CPI by 1.926.

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UNITED STATES

		Producer Price Index[1]		Consumer Price	GNP Implicit Price	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
		Industrial Commodities (1967 = 100)	All Commodities (1967 = 100)	Index[2] (1967 = 100)	Deflator[3] (1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	274.8	268.8	246.8	85.7	10.26	10.63	8.30	6.94
1981	Avg.	304.1	293.4	272.4	94.0	11.55	11.98	9.12	7.62
1982	Avg.	312.3	299.3	289.1	100.0	12.31	12.93	9.96	8.21
1983	Avg.	315.7	303.1	298.4	103.9	12.58	13.43	10.58	8.67
1984	Avg.	322.6	310.3	311.1	107.7	13.05	13.43	11.07	9.04
1985	Avg.	323.8	308.7	322.2	111.2	13.38	13.74	11.56	9.46
1986	Avg.	312.2	299.8	328.4	114.1	13.20	13.49	11.98	9.65
Jan	1987	313.5	300.9	333.1	—	12.94	12.98	12.18	9.84
Feb	1987	314.9	302.2	334.4	—	12.99	12.83	12.21	9.84
Mar	1987	315.7	302.7	335.9	116.1	13.04	12.79	12.24	9.84
Apr	1987	317.3	305.0	337.7	—	13.16	12.90	12.30	9.82
May	1987	318.3	307.1	338.7	—	12.97	12.92	12.31	9.83
Jun	1987	319.9	308.2	340.1	117.2	13.05	12.93	12.27	9.84
Jul	1987	322.1	309.8	340.8	—	13.06	13.07	12.37	9.89
Aug	1987	323.8	310.6R	342.7	—	13.03	13.07	12.34	9.90
Sep	1987	323.3	310.4	344.4	117.8	13.19	13.44	12.56	9.98
Oct	1987	324.9	311.4	345.3	—	12.96R	13.06R	12.52R	9.95R
Nov	1987	325.4	311.9	345.8	—	12.89P	13.11P	12.58P	10.01P
Dec	1987	325.3	311.7	345.7	118.7	—	—	12.61P	10.09P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in Report 233.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 233.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 233.

[4]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 233.

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SERVICE LOCATIONS

DENVER, COLORADO, USA
Three Park Central
1515 Arapahoe Street
Suite 900
Denver, Colorado 80202
Telephone: (303) 893-4015
Telecopy: (303) 825-4821
Telex: 450202 (NUEXCO DVR)

MENLO PARK, CALIFORNIA, USA
Building 1, Suite 105
3000 Sand Hill Road
Menlo Park, California 94025
Telephone: (415) 854-1510
Telecopy: (415) 854-2115
Telex: 470674 (NUEXCO)

TOKYO, JAPAN
Ohkura Building
1-4-10 Shiba Daimon
Minato-ku, Tokyo, Japan
Telephone: (81-3) 431-6025
Telecopy: (81-3) 434-6674
Telex: 242-5060 (JATECH J)

FERNEY-VOLTAIRE, FRANCE
13 chemin du Levant
01210 Ferney-Voltaire
France
Telephone: (33-50) 428035
Telecopy: (33-50) 428526
Telex: 385288 (NUEXCO F)

ZURICH, SWITZERLAND
135 Zürichstrasse
CH-8700 Küsnacht
Switzerland
Telephone: (41-01) 910-8977
Telecopy: (41-01) 910-6672
Telex: 829177 (COMAG CH)

HONG KONG
1403 Shui On Centre
6-8 Harbour Road, Wanchai
Hong Kong
Telephone: (852-5) 865-1418
Telecopy: (852-5) 865-2721
Telex: 67206 (CNTIC)

REPRESENTATIVES

AUSTRALIA **James G. Munro**
7 Nevada Street
North Balwyn, Victoria 3104
Australia
Telephone: (61-3) 857-6823
Telecopy: (61-3) 857-8258

SOUTH AFRICA **Chris I. von Christierson**
Southern Prospecting (Pty) Limited

Mailing Address
Post Office Box 61409
Marshalltown 2107
Republic of South Africa

Telephone: (27-11) 838-1868
(27-11) 834-4211

Street Address
10th Floor
Eagle Star House
70 Fox Street
Johannesburg 2001
Telecopy: (27-11) 834-3148
Telex: 4-89878-SA

UNITED STATES **Harold C. Lindberg**
83-A Hardee Lane
Whispering Pines, North Carolina 28327
Telephone: (919) 949-3622

JAPAN **Kazuo Yokota**
Japan Tech Services
Ohkura Building (3F)
1-4-10 Shiba Daimon
Minato-ku, Tokyo, Japan
Telephone: (81-3) 431-6031, 6025
Telecopy: (81-3) 434-6674
Telex: 242-5060 (JATECH J)

TAIWAN **Edward Bee**
Bee & Liang Company, Ltd.
14 FL Universal Business Center
NO. 663, Tun Hwa South Road
Post Office Box 1396
Taipei, Taiwan R.O.C.
Telephone: (886-2) 704-9630
Telecopy: (886-2) 703-4625
TWX 785-11570 (BEELIANG)

UNITED STATES **Ralph O. Smith**
141 Braemar Drive
Cheshire, Connecticut 06410
Telephone: (203) 272-6246
Telecopy: (203) 271-1346

INTERNATIONAL HEADQUARTERS

Three Park Central, Suite 900
1515 Arapahoe Street
Denver, Colorado 80202

Telephone: (303) 893-4015
Telecopy: (303) 825-4821
Telex: 450202/NUEXCO DVR